

# Practitioner Review: Social (pragmatic) communication disorder conceptualization, evidence and clinical implications

Courtenay F. Norbury

Royal Holloway, University of London, Egham, United Kingdom

**Background:** DSM-5 sees the introduction of Social (Pragmatic) Communication Disorder (SPCD), characterized by persistent difficulties using verbal and nonverbal communication for social purposes, in the absence of restricted and repetitive interests and behaviours. There is currently much confusion about the precise diagnostic criteria for SPCD and how this disorder relates to autism spectrum disorders (ASD), previous descriptions of pragmatic language impairment (PLI) and more specific language disorders (LD). **Method:** Proposed criteria for SPCD are outlined. A selective review of the evidence considers whether these criteria form a cohesive and distinct diagnostic entity. Approaches to assessment and intervention are discussed. **Results:** Implementing the new diagnosis is currently challenged by a lack of well-validated and reliable assessment measures, and observed continuities between SPCD and other neurodevelopmental disorders. High rates of comorbidity between SPCD and other seemingly disparate disorders (including conduct disorder, ADHD and disorders of known genetic origin) raise questions about the utility of this diagnostic category. **Conclusions:** SPCD is probably best conceptualized as a dimensional symptom profile that may be present across a range of neurodevelopmental disorders, although there is an urgent need to investigate the latent structure of SPCD using consistent diagnostic criteria. In addition, social communication and aspects of pragmatic language may be dissociated, with the latter heavily influenced by structural language attainments. Finally, there is a dearth of reliable and culturally valid assessment measures with which to make a differential diagnosis, and few rigorously tested intervention programmes. The implications for research and clinical practice are outlined. **Keywords:** Assessment, autism spectrum disorders, language disorder, pragmatics, social communication.

## Introduction

Successful communication requires us to go beyond the literal words uttered and draw on our knowledge and experiences to construct meaning. Sometimes this requires the use of linguistic context (pragmatics), in which children are expected to infer meaning or resolve ambiguities by integrating the surrounding language with their prior knowledge and experience. At other times, successful communication requires the use of language in social contexts (social communication). Here, a broad definition would include a child's understanding of speaker intentions and the verbal and nonverbal cues that signal those intentions, as well as the child's interpretation of the environmental context, societal norms and expectations and how these coalesce with structural aspects of language (e.g., vocabulary, syntax and phonology) to achieve successful communication. That some children experience difficulties with social communication, or that pragmatic language development can follow a qualitatively atypical course, is incontrovertible. However, the diagnostic status of children with atypical pragmatic and social communication development has long been debated (cf. Brooks & Bowler, 1992), fuelled most recently by the introduction of a new disorder, Social (Pragmatic)

Communication Disorder, to the DSM-5 (<http://www.psychiatry.org/practice/dsm/dsm5>; American Psychiatric Association, 2013a) and proposals for Pragmatic Language Impairment (PLI) to ICD-11 (World Health Organisation, 2013). A resolution of the debate is hampered by inconsistencies in terminology and diagnostic criteria, a paucity of reliable, culturally valid assessment tools supported by adequate normative data, and limited comparison of social communication profiles across different neurodevelopmental disorders.

The idea that some children may have significant social communication and/or pragmatic language impairments without meeting diagnostic criteria for autism is certainly not new (Bishop & Norbury, 2002); nosologies of developmental disorders have included children with atypical social pragmatic development for more than 30 years. For the most part, investigators have used the terms interchangeably, such that social communication and pragmatic language skills encompass the same behaviours. For instance, Rapin and Allen (1983) first described 'semantic-pragmatic deficit syndrome' as a constellation of symptoms including verbosity, comprehension deficits for connected speech, word finding deficits, atypical word choices, unimpaired phonology and syntax, inadequate conversation skills, speaking aloud to no one in particular, poor topic maintenance and answering beside the point of a question (Rapin, 1996). Rapin

Conflict of interest statement: No conflicts declared.

and Allen used this as a descriptive term that was most commonly applied to the communication profiles of children with autism spectrum disorder (ASD), but they acknowledged that social communication and pragmatic language impairments were also seen in many other developmental disorders. Bishop and Rosenbloom (1987) considered 'semantic-pragmatic disorder' to represent a distinct subgroup of children who occupied a diagnostic space between ASD and specific language impairment (SLI). Both systems emphasized a deficit in social communication and/or pragmatic language abilities in the context of relatively age-appropriate phonology and grammar. In an effort to improve diagnostic accuracy and interrater reliability, Bishop (1998) created the *Children's Communication Checklist*, which has rapidly become the most widely used, standardized measure of pragmatic ability in research and clinical contexts. However, Bishop (1998) reported that semantic items did not reliably distinguish children with suspected social pragmatic deficits from typically developing children or peers with SLI. As a result, the term 'PLI' became the generally accepted term for children with primary difficulties in the use of language in context (social or linguistic) who did not meet standard diagnostic criteria for pervasive developmental disorder. However, subsequent research made clear that many children identified with pragmatic deficits using the CCC had structural language impairments (Norbury, Nash, Baird, & Bishop, 2004) and that pragmatic deficits were manifest across a range of neurodevelopmental conditions, some of which involve impairments in general cognitive functioning (cf. Laws & Bishop, 2004). In ASD, deficits in pragmatic aspects of language are a recognized hallmark of the disorder (Tager-Flusberg, Paul, & Lord, 2005). However, children with ASD are commonly identified as having social communication disorders, rather than PLI, perhaps in an effort to emphasize the pronounced difficulties with face-to-face communication individuals with ASD may experience.

### Why does this debate matter?

The emphasis on identifying and delineating pragmatic and social communication deficits is surely welcome, so could there be any reason to object to the creation of a diagnostic category designed primarily to identify children who might otherwise slip through the net? I would argue that there are reasons to be concerned with the diagnosis in its current form, particularly as diagnosis typically carries with it a promise of tailored intervention and educational support. As differences in terminology highlight, there is considerable confusion surrounding the new diagnosis, and the different perspectives of the clinical practitioners who will be charged with making it. There is particular concern about the inclusion and possible exclusion criteria, which may mean that few individuals actually meet

diagnostic criteria. This is complicated by clear overlaps with the diagnostic criteria for language disorder and ASD, making differential diagnosis particularly challenging. There is also legitimate concern that children receiving this diagnosis would not receive the clinical or educational services that they may require. It has been documented that federal funding for research into ASD far outstrips that for language disorder (Bishop, 2010) and that children with ASD receive far more intensive and consistent educational support for language than peers with language disorder, even when the latter group have more severe language impairments (Dockrell, Ricketts, Palikara, Charman, & Lindsay, 2012).

In this review, I will outline proposed criteria for SPCD and consider the evidence that SPCD is a valid diagnostic construct. Most of the research I will review previously identified nonautistic children with social communication deficits as having PLI, although children with structural language impairments were not always excluded from these studies. For consistency, I will use the term SPCD to refer to the children included in past studies. However, I will argue that social communication and pragmatic language skills are not necessarily one and the same, with the latter closely associated with structural aspects of language. I will argue that to assess and treat SPCD, it is vital to understand the continuities between SPCD and both ASD and language disorder, as well as consider the high rates of comorbidity between SPCD and other developmental disorders. Finally, I will argue that as with most neurodevelopmental disorders, SPCD is best conceptualized along a set of symptom dimensions, rather than as a discrete categorical entity, although there is an urgent need to empirically establish the symptom profile that is associated with social pragmatic deficits in the absence of autism.

### DSM-5 criteria for social (pragmatic) communication disorder (SPCD)

One reason for the inclusion of SPCD within DSM-5 and PLI in ICD-11 is the well-publicized changes to criteria for autism and related conditions, and the potential impact of these changes on provision for individuals who no longer meet criteria for ASD (Huerta, Bishop, Duncan, Hus, & Lord, 2012; McPartland, Reichow, & Volkmar, 2012). Whereas previous diagnostic frameworks specified a triad of impairments, the new systems will focus on two symptom dimensions: social communication deficits and restricted and repetitive interests and behaviours (see Lord & Jones, 2012 for discussion). There have been discrepant estimates of how many individuals with existing diagnoses would still warrant a diagnosis of ASD under the new classification. For example, McPartland et al. (2012) reported that only 60.6% of participants with a current diagnosis would meet new criteria for ASD, whereas Huerta et al.

(2012) reported that 91% of their sample would retain their current diagnosis (although specificity in this sample was remarkably low at .53). Neither study was able to establish how many individuals would meet criteria for SPCD as the operational criteria for the new disorder are currently rather limited. However, Huerta et al. (2012) reported that only 1.5% of their participant pool met social communication criteria for ASD, but did not meet threshold criteria for RRIBs.

Such studies give rise to the concern that SPCD will be treated as a residual category for 'not-quite' ASD, rather like the previous PDD-NOS category (Skuse, 2012). A definition by exclusion could be particularly problematic as SPCD will come under the umbrella of Communication Disorders, a set of disorders that are typically the remit of speech-language pathologists. In this arena, restricted and repetitive interests and behaviours are not routinely assessed and definitively ruling out ASD may prove challenging.

Table 1 outlines inclusion criteria for SPCD (American Psychiatric Association, 2013b): Previous draft criteria acknowledged that SPCD could co-occur with disorders other than ASD, such as language disorder or intellectual disorder, but stipulated that social communication deficits could not be *explained* by deficits in vocabulary, grammar or general cognitive ability. Notably, current draft criteria for PLI in ICD-11 stipulate exclusion of both ASD and receptive/expressive language disorders.

Skuse (2012) raised a number of pertinent concerns about the SPCD diagnosis. First and foremost is how these diagnostic criteria will be operationalized and defined in such a way that they do not amount to ASD equivalent social and pragmatic deficits in the absence of restricted and repetitive interests and behaviours (RRIBs). Here, it may be helpful to consider whether SPCD is underpinned by the same cognitive constraints in different diagnostic groups. In ASD, there is an overriding assumption that SPCD is a consequence of core deficits in social cognitive processes such as theory of mind, while in other developmental populations, SPCD may occur in the absence of social cognitive deficit. Whether differences in the cognitive origins of SPCD yield qualitatively different communication profiles is an open question. A second concern is whether there is

any evidence that children with SPCD form a coherent and etiologically distinct group, requiring a different course of intervention or educational support. A related issue is the developmental course and diagnostic stability of SPCD; at what point can a diagnosis be made reliably and how does the phenotype change over time? Finally, Skuse (2012) queries whether the presence of RRIBs yields a qualitatively distinct social communication profile, or confers more functional impairment relative to SPCD in isolation. In a similar vein, I suggest that it would be unwise to assume that co-occurring language and intellectual impairments necessarily *cause* SPCD, given the intimate developmental relationships that exist between social, linguistic and cognitive achievements (Chiat & Roy, 2008). We need to know much more about how individual differences in each of these developmental pathways influence social communication development and disorder.

To begin to answer these questions, however, we need to identify the relevant children. Below, I outline best practices for assessment of social communication and pragmatic language abilities and highlight some of the difficulties in measuring these skills. I will then consider differential diagnosis of SPCD from ASD and Language Disorder, as well as the presence of SPCD in other neurodevelopmental disorders.

### Assessment and diagnosis of social communication and pragmatic language skills

Social communication and pragmatic language abilities are notoriously difficult to measure in standardized ways because they are a set of contextually dependent human behaviours that occur in dyadic exchanges; the structure provided by a standardized testing situation makes it difficult to capture social communication problems that may arise in everyday situations where the rules of engagement are less explicit and highly dynamic (Adams, 2002; Volden, Coolican, Garon, White, & Bryson, 2009). Social communication skills are also highly susceptible to cultural variation: discourse rules such as turn taking, interrupting, appropriate topic choices, use of eye contact and other nonverbal strategies for maintaining interaction, use of humour, and the ability to question and challenge communication

**Table 1** Social (pragmatic) communication disorder (American Psychiatric Association, 2013b)

1. Persistent difficulties in the social use of verbal and nonverbal communication in four key areas, all of which must be present for diagnosis:
  - a. using communication for social purposes such as greeting or exchanging information;
  - b. changing communication to match context or the needs of the listener;
  - c. following rules for conversation or storytelling, such as taking turns in conversation;
  - d. understanding what is not explicitly stated and nonliteral or ambiguous meanings of language.
2. Symptoms must be present in childhood and result in limitations to functional communication, social participation and relationships, academic achievement and occupational performance.
3. Rule out Autism Spectrum Disorder (i.e., does not meet threshold for repetitive behaviours or restricted interests)



partners, are largely determined by cultural rules and the child's relationship with his or her interlocutor (Carter et al., 2005). Unlike structural aspects of language (e.g., vocabulary or grammar), there are also far fewer normative data for such behaviours (Norbury & Sparks, 2013).

Adams (2002) provided a summary of developmental social communication and pragmatic attainments and a detailed examination of popular methods for assessing these skills. A brief overview is provided below and in Table 2, focusing on methods of assessing conversational skill, narrative ability and the understanding/use of ambiguity (i.e. inferencing, multiple meanings and figurative language). Measures are organized according to the method of assessment, including checklist or rating scale, structured observation and formal assessments with pragmatic content.

### *Parent teacher report of children's communication*

Given the inherent difficulties of extrapolating pragmatic performance in clinical settings to everyday communicative competencies (Volden et al., 2009), standardized checklists of pragmatic and social communication behaviours have become a popular method of assessment. The *Children's Communication Checklist* (CCC, Bishop, 1998; CCC-2, Bishop, 2003a, 2003b) is perhaps the most widely used checklist in clinical practice and research. The CCC-2 is a 70-item checklist comprised of 10 scales; eight scales tap structural and pragmatic language and two scales measure the social impairments and restricted interests more typical of ASD. Normative data are available on over 500 UK children and over 900 US children aged 4 to 17 years and it has been translated into more than 30 different languages. Respondents are asked to rate the frequency of communication behaviours on a four-point scale. In the original CCC, a pragmatic composite was derived by summing the scores of scales that tapped pragmatic language competence. These included inappropriate initiation, coherence, stereotyped language, use of context and conversational rapport. However, in the validation sample, this composite score had poor levels of interrater reliability and was not successful at discriminating children identified as having PLI from children with diagnoses of more specific language impairment (Norbury et al., 2004). One reason is that children with SLI obtained low scores on the pragmatic composite, highlighting an association between structural language and pragmatic language skill that has been consistently replicated (cf. Ketelaars, Cuperus, van Daal, Jansoni, & Verhoeven, 2009; Volden et al., 2009).

To address this issue, Bishop (2003a, 2003b) devised the Social Interaction Deviance Composite (SIDC), which identifies pragmatic abilities that are disproportionately impaired relative to structural language competencies. Thus, a positive score indi-

cates relatively mild pragmatic difficulties in conjunction with more severe deficits in structural language. Scores around zero are indicative of a child with equally severe pragmatic and structural language deficits (i.e., a significant proportion of children with ASD) and negative scores would be more consistent with a profile in which scores on structural language tests were within normal limits, but the child experienced pronounced social communication deficits. An important caveat is that amongst a large cohort of children with communication disorders, scores on the SIDC were continuously distributed, with no clear categorical boundaries between specific language impairment, SPCD or ASD (Norbury et al., 2004). Therefore, the CCC-2 should be used to signpost aspects of communication for further assessment, rather than providing a clear diagnosis itself.

In addition to parent or teacher report measures, clinicians may wish to rate aspects of a child's communicative behaviour more directly. Three main criteria for SPCD centre on the individual's conversational skills, specifically initiation and response to conversational bids, adapting conversation to listener needs and environmental expectations and following conversational rules, such as turn taking. Quantitative approaches to analysing conversation in detail have been developed with acceptable levels of interrater reliability (Bishop & Adams, 1989). Conversational analysis may also provide an ecologically valid tool with which to demonstrate improvements in pragmatic and social communication competence following intervention (Adams, Lloyd, Aldred, & Baxendale, 2006). Despite these advantages, it remains a time-consuming assessment method, which may limit its clinical and research utility. Measures such as the *Targeted Observation of Pragmatics in Children's Conversation* observation scale (Adams, Gaile, Freed, & Lockton, 2010) shows promise as a method of rating the quality of conversational exchanges, and is sensitive to developmental change (Adams et al., 2012). However, there is little research at present regarding its diagnostic sensitivity and specificity.

### *Structured observation*

An advantage of structured observations is that the examiner can create naturalistic contexts specifically designed to elicit social communication behaviours, thus judging whether or not they occur and whether there are qualitative differences in the child's communicative behaviours. 'Conversational' behaviours can also be assessed prior to the advent of spoken language. Three measures, the *Early Social Communication Scales* (Mundy et al., 2003), the *Communication and Symbolic Behavior Scales* (Wetherby & Prizant, 1993) and the *Autism Diagnostic Observation Schedule (ADOS)-Toddler Module* (Luyster et al., 2009) assess how infants and toddlers initiate and respond to interactions with adults. This may include

**Table 2** Methods of assessing social communication and pragmatic language abilities

Name of test	Authors	Age	Aspects of social communication covered	Pros/Cons
Checklists and rating scales Children's Communication Checklist-2	Bishop (2003a, 2003b)	4–16 years	Syntax, Speech, Inappropriate initiation, Coherence, Stereotyped conversation, Use of context, Rapport, Social interaction, RRB	Does not provide diagnosis, but can inform further assessment decisions
Targeted Observation of Pragmatics in Children's Conversations (TOPICC)	Adams et al. (2011)	6–11 years	Reciprocity, turn-taking, taking account of listener knowledge, verbosity, topic management, discourse style, response problems	Quick index of conversational skill, but currently lacks adequate interrater and test-retest reliability
Analysis of Language Impaired Children's Conversation (ALICC)	Bishop and Adams (1989)	4-adult	Discourse participation; conversational dominance; assertiveness; verbosity; responsiveness; meshing (e.g., appropriate responses)	Detailed profile of conversation that can distinguish SPCD from language disorder; time consuming
Structured observations Communication and Symbolic Behavior Scales	Wetherby and Prizant (1993)	6–24 months	Communicative, social, affective and symbolic abilities (including play)	Most appropriate for young children; overview of nonverbal communication
Early Social Communication Scales	Mundy et al. (2003)	8–30 months	Initiating and responding to joint attention; behavioural requests; social interaction behaviours	Most appropriate for young children; overview of nonverbal communication
Autism Diagnostic Observation Schedule (ADOS) Modules 1–4	Lord et al. (2001)	18 months – adulthood	Play, Response to Name, Response to Joint Attention, nonverbal communication (gesture and facial expression), Functional and Symbolic Imitation, personal narrative, conversation, emotions, social relationships	Later modules include ratings of conversation (4-part exchange) and aspects of social communication; does not specifically probe pragmatic language
Yale Pragmatic Protocol	Schoen and Paul (2009)	9–17 years	Pragmatic probes within five conversational domains (discourse management, communicative function, conversational repair, presupposition, register variation)	Structure probes of social communication in seminaturlistic setting; little evidence that it distinguishes SPCD from other language disorder
Formal assessments with pragmatic content Assessment of Comprehension and Expression (ACE 6-11)	Adams et al. (2001)	6–11 years	Sentence comprehension, Inferential comprehension, Naming, Syntactic Formulation and Semantic Decisions, nonliteral language, narrative retelling	Combines structural language and pragmatic language tasks. Narrative is especially appropriate for school-aged children
Test of Language Competence	Wiig and Secord (1989)	5–18 years	Ambiguous Sentences, Listening Comprehension, Making Inferences, Recreating Speech Acts Figurative Language	Formal test which may not reflect abilities in everyday contexts
Test of Pragmatic Language Bus story	Phelps-Terasaki and Phelps-Gunn (2007) Renfrew (1995)	8–18 years 3–8 years	Physical setting, audience, topic, purpose (speech acts), visual-gestural cues, and abstraction Narrative recall	Covers wide range of social communication behaviours Good prognostic measure of persistent language deficits
Expression, Reception and Recall of Narrative Instrument (ERRNI) Strong Narrative Assessment Procedure	Bishop (2003a, 2003b) Strong (1998)	6-adult 7–12 years	Narrative comprehension and recall Narrative generation and comprehension	Stories include a 'theory of mind' element Unusual in that it does not involve a retelling and so may be more sensitive to social pragmatic deficits

observation of whether the child uses eye gaze, gesture or vocalizations to gain the adult's attention, direct attention or respond to a direct request. Such measures usually include 'presses', which attempt to elicit specific communicative acts. For example, the child might be shown a very tempting wind-up toy. After demonstrating what the toy can do, the examiner will hold back and wait to see whether and how the child obtains help from an adult to make the toy move again. For older children and adolescents, measures such as the *ADOS* and *ADOS-2* (Lord, Rutter, DiLavore, & Risi, 2001) and the *Yale in vivo Pragmatics Protocol* (Schoen & Paul, 2009) include more sophisticated 'presses' including observation of how the child greets an unfamiliar adult, whether the child spontaneously offers information about his/her own experiences and how the child integrates verbal and nonverbal (e.g., eye gaze, gesture) communication behaviours.

A rather blunt measure of conversational skill is also included in the *ADOS* (Lord et al., 2001). Here, the examiner attempts to engage the individual in a conversational exchange, providing 'hooks' to which the child is expected to comment or question the examiner further. The conversation is scored on a 4-point scale, with a score of 3 indicating total absence of conversation, and a score of 0 representing a conversation that has at least four coherent turns (e.g., examiner comments, child questions, examiner responds and child comments). Separate codes tap quality of initiations or response, use of facial expression and gesture, and the integration of verbal and nonverbal information for communicative purposes.

One strength of structured observations such as the *ADOS* is that they provide a consistent context in which to observe qualitatively different or unusual communication behaviours. A limitation of these assessments is that there are few normative data available on which to make judgements of conversational adequacy. Modules 3 and 4 of the *ADOS* cover a wide age range from 4 years to adulthood. While typically developing four-year olds are capable of sophisticated conversational exchanges, we might expect qualitative differences between conversational skills of children and adults. In addition, the degree to which children feel able to comment or question unfamiliar adults is culturally dependent (cf. Norbury & Sparks, 2013).

### *Formal assessments with pragmatic content*

Narrative analysis constitutes an important tool for revealing pragmatic deficits, as it taps the integration of linguistic, cognitive and social pragmatic abilities. Narrative measures allow assessment of the child's ability to convey a coherent sequence of events, provide the right amount of key information to the listener and use cohesive devices consistently. In addition, unusual or bizarre comments thought to be indicative of ASD may be revealed, although

interrater reliability of 'bizarre' comments can be disappointingly low (Norbury & Bishop, 2003) and are present in only a minority of ASD narratives (Norbury, Gemmell, & Paul, 2013). Several standardized assessments of narrative exist, including the *Bus Story* (Renfrew, 1995), the *Expression, Reception and Recall of Narrative Instrument* (Bishop, 2003a, 2003b) and the *Strong Narrative Assessment Procedure* (Strong, 1998). Less formal assessment measures include telling a story from a picture book (Norbury & Bishop, 2003) or generating narrative in response to a story stem (Demir, Levine, & Goldin-Meadow, 2010).

Narrative is an important part of clinical assessment not least because it is a foundational skill for academic achievement (Boudreau, 2008). However, narrative skills are vulnerable across a range of developmental disorders and direct comparisons of different clinical populations have yielded few quantitative or qualitative differences in narrative performance (Norbury & Bishop, 2003; Norbury et al., 2013; Finestack, Palmer, & Abbeduto, 2012). Furthermore, measures of structural language ability are typically the strongest predictors of narrative competence within clinical populations (Kay-Raining Bird, Cleave, White, Pike, & Helmckay, 2008).

More direct assessment of pragmatic language ability may also include measures of inferencing, understanding of humour or figurative expressions such as metaphor, idiom or irony, and referential communication, including the child's ability to request clarification or identify messages that are ambiguous or underinformative. Standardized measures, such as the *Test of Language Competence* (Wiig & Secord, 1989) or the *Test of Pragmatic Language-2nd Edition* (Phelps-Terasaki & Phelps-Gunn, 2007) have distinguished groups of children with known pragmatic deficits from comparison groups (Young, Diehl, Morris, Hyman, & Bennetto, 2005). However, Adams (2002) argues that such formal testing measures are unlikely to reveal an accurate or comprehensive picture of the child's pragmatic competence in more dynamic, context dependent communicative exchanges.

### **Social communication and pragmatic language: same or different?**

Social (Pragmatic) Communication Disorder criteria stipulate that impairments should be evident in all four of the aspects of communication specified: using communication for social exchange, adapting communication style to the context, following rules of conversation or narrative convention and understanding implicit or ambiguous language. It would appear that this requirement presumes that social communication and pragmatic language skills are manifestations of the same underlying cognitive process(es). Indeed, these skills are closely associated; a recent population study demonstrated that pragmatic language skills were highly predictive of social



competence, even after expressive language abilities had been taken into account (Ketelaars, Cuperus, Jansonius, & Verhoeven, 2010). However, there is mounting evidence that even within the autism spectrum, social communication deficits and pragmatic language impairments may be dissociated, and can arise from different underlying constraints.

Traditionally, social pragmatic impairments in ASD have been attributed to the absence or attenuation of the social instinct (Wing, Gould, & Gillberg, 2011) and a fundamental impairment in 'theory of mind' (Baron-Cohen, Leslie, & Frith, 1985). A lack of social motivation can readily explain conversational impairments such as a lack of initiation or minimal contingent responses. Reduced experience with social interaction may alter the course of pragmatic development, in that it limits exposure to nonverbal communicative gestures (facial expression, gesture) and the flexible nature of language use. Social cognitive deficits are hypothesized to lead to reduced ability to represent a listener's state of mind; this could contribute the recognized limitations in providing the appropriate amount of information to minimize ambiguities in conversation (Capps, Kehres, & Sigman, 1998; Tager-Flusberg & Anderson, 1991) or conveying sufficient information of interest to the listener in conversation and narrative tasks (Capps, Losh, & Thurber, 2000). Difficulties understanding speaker intentions have also been attributed to reported deficits in understanding figurative language such as metaphor and irony (Happé, 1993; Martin & McDonald, 2004), and deficits in referential communication (Nadig, Vivanti, & Ozonoff, 2009).

However, it is important to realize that there is usually considerable variation within ASD groups on these tasks and that social communication abilities have been linked not only to mentalizing, but are often associated with structural language abilities (see Gernsbacher & Pripas-Kapit, 2012 for discussion in relation to figurative language). For instance, Norbury (2005) investigated metaphor comprehension in children with ASD and compared those with additional language impairments (ALI) with those who scored within normal limits on assessments of structural language competence (ALN). Notably, these groups did not differ with respect to social communication deficit, as measured by the *Social Communication Questionnaire* (Rutter, Bailey & Lord, 2003), nor do they typically differ on ADOS or *Vineland Adaptive Behavior Scales* social indices (cf. Norbury et al., 2009). Children with ALN did not differ from typically developing peers on the metaphor task, whereas those with ALI had significantly lower scores. Moreover, scores on measures of structural language predicted unique variance in metaphor understanding, whereas scores on Theory of Mind tasks did not.

Furthermore, studies employing experimental measures of inferencing ability and ambiguity resolution have found few differences between individuals with ASD and typically developing peers, providing

the individuals with ASD had age-appropriate structural language abilities (Brock, Norbury, Einav, & Nation, 2008; Norbury, 2005; Pijnacker, Hagoort, Buitelaar, Teunisse, & Geurts, 2009). Structural language abilities reliably predict performance on these tasks, even within ASD populations (Volden et al., 2009). Thus, it would seem that social communication deficits may be evident in children who are indistinguishable from TD peers on measures of pragmatic language functioning.

Social communication undoubtedly draws on a number of skills, of which social cognition (as measured by theory of mind tasks) is just one. And it is possible that a stronger relationship would be found between social communication and pragmatic language abilities if different tasks were employed to measure pragmatic language skill. Nevertheless, the studies cited above suggest that to require both social and pragmatic deficits to be present may preclude diagnosis in young people with average or above average structural language skills. Conversely, those most likely to demonstrate impairments in both are very likely to have additional impairments in word knowledge and grammar, which may also preclude diagnosis.

### Differential diagnosis of SPCD

#### *Is SPCD a milder form of ASD?*

Crucially, DSM-5 and ICD-11 will require that children with SPCD do not exhibit clinically significant RRIBs. There has been some disagreement in the literature regarding the extent to which children identified as having primary SPCD show evidence of RRIBs. Reisinger, Cornish, and Fombonne (2011) explicitly compared children with ASD and children with SPCD on the ADOS and the SCQ. They found that the groups could be distinguished by the severity of social and communication deficits, but did not differ significantly on measures of RRIB. In contrast, Bishop and Norbury (2002) used similar methods and reported that children with SPCD as a group were less likely to display RRIBs. However, the majority of children with SPCD were rated as having speech abnormalities associated with autism and used stereotyped language. In addition, a significant minority were reported to have unusual sensory interests. Changes to DSM-5 criteria for ASD include the reclassification of stereotyped language as an RRIB, rather than a communication symptom, and include sensory interests. Thus, many of the children studied by Bishop and Norbury (2002) may meet new DSM-5 criteria for ASD.

These studies used the ADOS and the SCQ to quantify RRIB; the reliability of these algorithms is low (Lord et al., 2000) and the scales are perhaps not detailed enough to identify differences between diagnostic groups. A recent study by Gibson, Adams, Lockton, and Green (2013) utilized the *Repetitive*

*Behaviour Questionnaire-2* (Leekam et al., 2007) and reported that children with SPCD could be distinguished from peers with ASD on this measure. However, the children included in this study were young, aged between 6 and 11 years. A complication for differential diagnosis is that symptom profiles may change significantly with age (Bishop & Norbury, 2002; Howlin, Mawhood, & Rutter, 2000), with an increase in specialist interests and rigid behaviour becoming more evident over developmental time. Thus, a group difference in the early school years may be less apparent in adolescence. A further complication is that few studies have measured RRIBs in children with SPCD in relation to typically developing peers. It is likely that even if children with SPCD do not exhibit enough RRIBs to meet threshold for ASD, they have elevated levels of RRIB relative to peers. In short, it may not be possible to distinguish ASD and SPCD on the basis of behavioural profiles alone (Reisinger et al., 2011).

### *Is SPCD a form of Language Disorder?*

DSM-5 criteria for Language Disorder stipulate that children will have impairments in any one of three areas: word knowledge, grammar and discourse. Discourse includes narrative and conversational exchange, thus overlapping with SPCD. Children with more 'specific' forms of Language Disorder have variable social interaction and social communication difficulties relative to TD peers. These may include difficulties establishing social relationships (Whitehouse, Watt, Line, & Bishop, 2009); poorer quality friendships (Durkin & Conti-Ramsden, 2007); difficulties with peer negotiation and conflict (Brinton, Fujiki, & McKee, 1998; Horowitz, Jansson, Ljungberg, & Hedenbro, 2006) and poorer social cognition (Marton, Abramoff, & Rosenzweig, 2005). In general, it is argued that these social deficits are secondary to the language impairment and strong associations between language test performance and measures of social deficit support this view (Gibson et al., 2013). However, measures do not always correlate, and there is some suggestion that social deficits might be concomitant with language impairment (Marton et al., 2005). It is also typically the case that on measures of social competence, there is a pattern of increasing severity in which children diagnosed with ASD demonstrate the most severe social impairments, children with language disorder the mildest deficits and children with SPCD falling between the two (cf. Gibson et al., 2013). Often performance is continuously distributed with little clear indication of where diagnostic boundaries lie.

Difficulties with pragmatic aspects of language are more consistently vulnerable in children with language disorders. For instance, compared with age-matched peers, children with 'specific' language impairment have deficits in narrative (Norbury et al., 2013), inferencing (Katsos, Roqueta, Estevan, &

Cummins, 2011), figurative language comprehension (Norbury, 2005) and the use of language context to resolve ambiguities (Brock et al., 2008). Furthermore, distinguishing children with language disorders from those with SPCD on these sorts of pragmatic tasks has met with little success, typically because of the poor performance of children with language impairment. At a group level, differences have been reported in the severity of expressive language disorder (with SPCD experiencing less severe impairments) and in the severity of peer social difficulty (Gibson et al., 2013). However, this is not always the case and the distinction between the two remains one of degree (Norbury et al., 2004).

The clearest evidence for a distinction between language disorder and SPCD comes from detailed analyses of conversational adequacy (Adams & Bishop, 1989; Bishop & Adams, 1989; Bishop, Chan, Adams, Hartley, & Weir, 2000). In these studies, children with SPCD were more likely than language-impaired peers to violate turn-taking expectations, provide no response or pragmatically inappropriate responses to conversational overtures, and made little use of nonverbal communicative devices. Such studies emphasize the importance of measuring social communication in naturalistic conversational exchanges (Adams & Lloyd, 2005). However, the strength of group difference rests with the diagnostic profiles of the children with SPCD. Clearly, DSM-5 criteria were not employed in these studies and it is possible that the more severely impaired children may have met DSM-5 criteria for ASD (Bishop, Whitehouse, Watt, & Line, 2008). Given that the new diagnostic criteria focus so heavily on dyadic conversational exchanges, developing an appropriate analysis measure and honing in on aspects of conversation that yield stable, qualitative differences is an important priority for future research.

### **SPCD is a feature of other neurodevelopmental disorders**

A number of studies have highlighted social and pragmatic deficits in diverse clinical populations, including ADHD (Bishop & Baird, 2001; Cohen et al., 1998; Geurts et al., 2004; Leonard, Milich, & Lorch, 2011); William's syndrome (John, Rowe, & Mervis, 2009; Laws & Bishop, 2004; Philofsky, Fidler, & Hepburn, 2007), conduct disorder (Donno, Parker, Gilmour, & Skuse, 2010; Gilmour et al., 2004; Oliver, Barker, Mandy, Skuse, & Maughan, 2011), closed head injury (Dennis & Barnes, 2001) and spina bifida/hydrocephalus (Holck, Nettelblatt, & Sandberg, 2009). Where comparisons have been made between ASD and other clinical populations, children with ASD (meeting criteria in both social communication and RRIB domains) have demonstrably more severe social communication and pragmatic language deficits than other clinical groups (ADHD, Geurts et al., 2004; Williams syndrome, Philofsky et al., 2007).



There is intense research and clinical interest in using the CCC/CCC-2 to identify qualitatively different social communicative profiles that align with specific clinical diagnoses, with varying success. For example, Bishop and Baird (2001) reported that the CCC identified pragmatic deficits in children with pervasive developmental disorders, primary pragmatic language impairments and children with ADHD, but that there were no significant differences amongst the clinical groups in pragmatic profile. On the other hand, Geurts et al. (2004) reported that children with ADHD had more severe deficits on items tapping initiation relative to peers with ASD, while those with ASD had more impaired scores on scales tapping structural language and RRIB. Philofsky et al. (2007) reported that children with William's syndrome had significantly better scores on CCC scales tapping coherence, stereotyped language, non-verbal communication and social relations relative to peers with ASD. However, it is important to bear in mind that most of the differences between clinical groups are a matter of degree and are reported at a group level. There remains much work to be carried out on the sensitivity and specificity of particular pragmatic profiles for differential diagnosis. In addition, clinical groups often differ with regard to structural language, social understanding, cognitive ability and the presence of other developmental concerns such as attention deficits, executive dysfunction and behavioural difficulties, all of which are strongly associated with social and pragmatic deficits (Ketelaars et al., 2009; Mackie & Law, 2010). Individual differences in social communication and pragmatic language are therefore likely to reflect a confluence of risk factors in each of these developmental areas. How these factors interact over time to affect social interaction and contextual processing is an empirical question. It is therefore unlikely that there is a syndrome-specific social pragmatic profile. Instead, there will be individual variation associated with the particular constellation of risk factors that the child experiences. One may hypothesize that ASD represents the extreme end of the distribution in which multiple risk factors are present, creating the least favourable conditions for pragmatic language and social communication to develop.

### **Clinical and educational implications: treatment**

One advantage of creating a new diagnostic category is that it should indicate a specific course of treatment or educational support. If we identify SPCD as a clinical disorder, treatment is likely to be aimed at improving social communication outcomes, to foster improvements in social relationships and to prevent negative consequences such as disruptive behaviour and social withdrawal. There is a paucity of good quality intervention research, in part hampered by inconsistencies in diagnostic labels, lack of agree-

ment concerning diagnostic criteria and valid instruments for measuring change (Gerber, Brice, Capone, Fujiki, & Timler, 2012). Adams et al. (2012) reported the first randomized controlled trial of a social communication intervention aimed specifically at children with SPCD. The Social Communication Intervention Project (<http://www.psych-sci.manchester.ac.uk/scip/>) is an individualized intervention approach that targets development in three areas: social understanding and social interaction; verbal and nonverbal pragmatic skills, including conversation; and language processing, including narrative, inferring, and developing word knowledge. In the trial, 88 children with SPCD were randomly assigned to the intervention or treatment as usual. After 20 sessions of intensive intervention by a highly specialist speech-language therapist, significant treatment effects were reported for ratings of conversational competence (blind ratings), parent ratings of pragmatic skill and social communication (not blind) and teacher ratings of classroom learning (not blind). No significant treatment effects were seen for the primary outcome measure (the *Clinical Evaluation of Language Fundamentals-4UK*, Semel, Wiig, & Secord, 2003) or a test of narrative expression.

The study is very promising in demonstrating that observable differences in social communication behaviour can be achieved after a period of intensive intervention. However, there are clearly many challenges to overcome. Study participants were extremely heterogeneous, varying from the 3rd to the 95th percentile on all measures of structural language, nonverbal reasoning, and ASD symptomatology. Such extreme within-group differences make it difficult to discern treatment effects. In addition, the outcome measure bore little relationship with the treatment content or treatment aims. Treatment most commonly aims to optimize language and communicative function rather than 'cure' disorder. In that regard, it is unlikely that diagnostic instruments themselves are sensitive enough to show change. However, the need for standardized assessment of social communicative function is great and a top priority for future research. Given the complexities of social communication and pragmatic language, it is also perhaps unrealistic to think that we can expect significant change in a relatively brief period of intervention. It is likely that these children will require on-going support as they get older and the complexity of social communication and language context increases in the expectation for more intimate social relationships, and for using language for learning and employment.

### **Summary and future directions**

At present, there is too little research evidence to fully support a new diagnostic category, or to help identify aspects of social communication that distinguish SPCD from other developmental conditions. Social communication disorders and pragmatic language

impairments constitute a broad range of phenomena that are likely to be continuous in nature and influenced by a number of developmental achievements. Social communication and pragmatic language skills are not necessarily one and the same; if pragmatics is taken to be the understanding and use of language in context, many children will succeed at pragmatic language tasks such as inferencing and ambiguity resolution and yet be challenged by the nuances of successful social communication.

To establish the validity of SPCD as a diagnostic entity, clinical research must (1) describe a coherent clinical phenomenon; (2) develop culturally and ecologically valid assessment tools with adequate levels of interrater and test-retest reliability to improve consistency of diagnosis; (3) explicitly compare pragmatic profiles across different neurodevelopmental disorders; (4) chart the developmental trajectories of children with SPCD and monitor the stability of diagnosis over time; and (5) conduct family studies to begin to unravel the aetiology of this disorder and its relation with other neurodevelopmental conditions (cf. Robins & Guze, 1970). In addition, intervention studies are urgently needed as they will offer a means to test theories regarding the putative causes and consequences of social (pragmatic) communication disorders.

### Clinical implications

Differential diagnosis of SPCD will be challenging, but the focus on social communication and pragmatic language abilities should be welcomed. Many children presenting for psychological or psychiatric assessment will have some degree of pragmatic language or social communication deficit (Cohen, Farnia, & Im-Bolter, 2013; Cohen et al., 1998) that will require specialist treatment and support. It would therefore seem prudent to obtain parental report of communi-

cation skills in everyday contexts, for example using the CCC-2 (Bishop, 2003a, 2003b). Such a measure can inform hypotheses and assessment plans; where there is evidence of a significant social pragmatic deficit, evaluation for ASD will also be essential. On the CCC-2, an index score of zero indicates that both structural and pragmatic language impairments may be evident; thus, an evaluation by a speech-language therapist for language disorder will be necessary. Although standardized measures for exploring pragmatic aspects of language exist, these may not reflect the individual's ability to apply these skills in less formal settings. Observations of naturalistic interaction, in school or at home, may be most informative. Finally, intervention is likely to be multifaceted, incorporating techniques for improving social understanding and social interaction, structural aspects of language (e.g., vocabulary) and using linguistic context to improve comprehension. Thus, intervention should be centred on the profile of strength and need that emerges from the assessment process, rather than the diagnostic label obtained.

### Acknowledgement

The open access fee for this article has been funded by the Economic and Social Research Council (ESRC). This review article was invited by the Editors of JCPP, for which the author has been offered a small honorarium towards personal expenses. The author has declared that she has no competing or potential conflicts of interest.

### Correspondence

Dr Courtenay Frazier Norbury, Department of Psychology, Royal Holloway, University of London, Egham, Surrey TW20 0EX, United Kingdom; Email: courtenay.norbury@rhul.ac.uk

### Key points

- Children with developmental disorders are vulnerable to impairments in social communication and pragmatic language (for instance, inferencing and narrative). This is particularly true for children with autism spectrum disorder.
- The DSM-5 has introduced a new clinical diagnosis, Social (Pragmatic) Communication Disorder, for children who do not meet criteria for autism spectrum disorder, but who exhibit social communication and pragmatic language impairments.
- Diagnosis of SPCD is currently challenged by a lack of culturally valid assessment tools and a paucity of research evidence that the diagnostic criteria identify a coherent and persistent clinical condition.
- The existing evidence suggests that social communication and pragmatic language impairments are best conceived of as symptoms, rather than a diagnostic entity.
- In addition, social communication and pragmatic language impairments do not necessarily go together and therefore the requirement that both are present for diagnosis is untenable.
- Many children with social communication and pragmatic language impairments are likely to have concomitant disorders of language and cognition.
- Future research is urgently needed to develop robust assessment tools and to track the family history and developmental trajectories of children with SPCD using consistent and reliable diagnostic criteria.

## References

- Adams, C. (2002). Practitioner Review: The assessment of language pragmatics. *Journal of Child Psychology and Psychiatry*, 43, 973–987.
- Adams, C., & Bishop, D. (1989). Conversational characteristics of children with semantic-pragmatic disorder. I: Exchange structure, turn taking, repairs and cohesion. *British Journal of Disorders of Communication*, 24, 211–219.
- Adams, C., Gaile, J., Freed, J., & Lockton, E. (2010). Targeted Observation of Pragmatics in Children's Conversation (TOPICC). Available from: <http://www.psych-sci.manchester.ac.uk/scip/topicc.pdf> [last accessed 31 January 2013].
- Adams, C., & Lloyd, J.T. (2005). Elicited and spontaneous communicative functions and stability of conversational measures with children who have pragmatic language impairments. *International Journal of Language and Communication Disorders*, 40, 333–348.
- Adams, C., Lloyd, J., Aldred, C., & Baxendale, J. (2006). Exploring the effects of communication intervention for developmental pragmatic language impairments: A signal-generation study. *International Journal of Language and Communication Disorders*, 41, 41–66.
- Adams, C., Gail, J., Lockton, E., & Freed, J. (2011). Targeted observation of pragmatics in children's conversations (TOPICC): adapting a research tool into a clinical assessment profile. *Speech and Language Therapy in Practice*, (Spring), 7–10.
- Adams, C., Lockton, E., Freed, J., Gaile, J., Earl, G., McBean, K., ... & Law, J. (2012). The Social Communication Intervention Project: A randomised controlled trial of the effectiveness of speech and language therapy for school-age children who have pragmatic and social communication problems with or without autism spectrum disorder. *International Journal of Language and Communication Disorders*, 47, 233–244.
- American Psychiatric Association. (2013a). Social (Pragmatic) Communication Disorder: DSM-5 Fact Sheet. Available from: <http://www.psychiatry.org/practice/dsm/dsm5> [last accessed 31 January 2013].
- American Psychiatric Association (2013b). *Diagnostic and statistical manual of mental disorders, fifth edition (DSM-5)*. Arlington, VA: American Psychiatric Publishing.
- Baron-Cohen, S., Leslie, A.M., & Frith, U. (1985). Does the autistic child have a "theory of mind?". *Cognition*, 21, 37–46.
- Bishop, D.V.M. (1998). Development of the Children's Communication Checklist (CCC): A method for assessing qualitative aspects of communicative impairment in children. *Journal of Child Psychology and Psychiatry*, 39, 879–891.
- Bishop, D.V.M. (2003a). *Children's Communication Checklist-2*. London: Psychological Corporation.
- Bishop, D.V.M. (2003b). *Expression, Reception and Recall of Narrative Instrument*. London: The Psychological Corporation.
- Bishop, D.V. (2010). Which neurodevelopmental disorders get researched and why? *PLoS ONE*, 5, e15112.
- Bishop, D.V., & Adams, C. (1989). Conversational characteristics of children with semantic-pragmatic disorder. II: What features lead to a judgement of inappropriacy? *British Journal of Disorders of Communication*, 24, 241–263.
- Bishop, D.V., & Baird, G. (2001). Parent and teacher report of pragmatic aspects of communication: Use of the children's communication checklist in a clinical setting. *Developmental Medicine and Child Neurology*, 43, 809–818.
- Bishop, D., Chan, J., Adams, C., Hartley, J., & Weir, F. (2000). Conversational responsiveness in specific language impairment: Evidence of disproportionate pragmatic difficulties in a subset of children. *Development and Psychopathology*, 12, 177–199.
- Bishop, D.V.M., & Norbury, C.F. (2002). Exploring the borderlands of autistic disorder and specific language impairment: A study using standardised diagnostic instruments. *Journal of Child Psychology and Psychiatry*, 43, 917–929.
- Bishop, D.V.M., & Rosenbloom, L. (1987). Childhood language disorders: Classification and overview. In W. Yule, & M. Rutter (Eds.), *Language Development and Disorders. Clinics in Developmental Medicine (double issue)*, Nos. 101-2 (pp. 16–41). MacKeith Press: London.
- Bishop, D.V.M., Whitehouse, A.J.O., Watt, H.J., & Line, E.A. (2008). Autism and diagnostic substitution: Evidence from a study of adults with a history of developmental language disorder. *Developmental Medicine and Child Neurology*, 50, 341–345.
- Boudreau, D. (2008). Narrative abilities: Advances in research and implications for clinical practice. *Topics in Language Disorders*, 28, 99–114.
- Brinton, B., Fujiki, M., & McKee, L. (1998). Negotiation skills of children with specific language impairment. *Journal of Speech, Language and Hearing Research*, 41, 927–940.
- Brock, J., Norbury, C.F., Einav, S., & Nation, K. (2008). Eye-movements reveal context processing difficulties among children with autism and language impairments. *Cognition*, 108, 896–904.
- Brooks, S., & Bowler, D. (1992). Autism by another name? Semantic and pragmatic impairments in children. *Journal of Autism and Developmental Disorders*, 22, 61–81.
- Capps, L., Kehres, J., & Sigman, M. (1998). Conversational abilities among children with autism and children with developmental delays. *Autism*, 2, 325–344.
- Capps, L., Losh, M., & Thurber, C. (2000). 'The frog ate the bug and made his mouth sad': Narrative competence in children with autism. *Journal of Abnormal Child Psychology*, 28, 193–204.
- Carter, J.A., Lees, J.A., Muria, G.M., Gona, J., Neville, B.G.R., & Newton, C.R.J.C. (2005). Issues in the development of cross-cultural assessments of speech and language for children. *International Journal of Language and Communication Disorders*, 40, 385–401.
- Chiat, S., & Roy, P. (2008). Early phonological and sociocognitive skills as predictors of later language and social communication outcomes. *Journal of Child Psychology and Psychiatry*, 49, 635–645.
- Cohen, N.J., Farnia, F., & Im-Bolter, N. (2013). Higher order language competence and adolescent mental health. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 54, 733–744.
- Cohen, N.J., Menna, R., Vallance, D.D., Barwick, M.A., Im, N., & Horodezky, N.B. (1998). Language, social cognitive processing, and behavioural characteristics of psychiatrically disturbed children with previously identified and unsuspected language impairments. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 39, 853–864.
- Demir, E., Levine, S.C., & Goldin-Meadow, S. (2010). Narrative skill in children with early unilateral brain injury: A possible limit to functional plasticity. *Developmental Science*, 13 (4), 636–647.
- Dennis, M., & Barnes, M.A. (2001). Comparison of literal, inferential, and intentional text comprehension in children with mild or severe closed head injury. *Journal of Head Trauma Rehabilitation*, 16 (5), 456–468.
- Dockrell, J., Ricketts, J., Palikara, O., Charman, T., & Lindsay, G. (2012). *Profiles of need and provision for children with language impairments and autism spectrum disorders in mainstream schools: A prospective study*. Research Report DFE-RR247-BCRP9. London: Department for Education.
- Donno, R., Parker, G., Gilmour, J., & Skuse, D.H. (2010). Social communication deficits in disruptive primary-school children. *British Journal of Psychiatry*, 196, 282–289.
- Durkin, K., & Conti-Ramsden, G. (2007). Language, social behavior, and the quality of friendships in adolescents with



- and without a history of specific language impairment. *Child Development*, 78, 1441–1457.
- Finestack, L.H., Palmer, M., & Abbeduto, L. (2012). Macrostructural narrative language of adolescents and young adults with Down syndrome or fragile X syndrome. *American Journal of Speech Language Pathology*, 21, 29–46.
- Gerber, S., Brice, A., Capone, N., Fujiki, M., & Timler, G. (2012). Language use in social interactions of school-age children with language impairments: An evidence-based systematic review of treatment. *Language, Speech and Hearing Services in Schools*, 43, 235–249.
- Gernsbacher, M.A., & Pripas-Kapit, S.R. (2012). Who's missing the point? A commentary on claims that autistic persons have a specific deficit in figurative language comprehension. *Metaphor and Symbol*, 27, 93–105.
- Geurts, H.M., Verté, S., Oosterlaan, J., Roeyers, H., Hartman, C.A., Mulder, E.J., ... & Sergeant, J.A. (2004). Can the Children's Communication Checklist differentiate between children with autism, children with ADHD, and normal controls? *Journal of Child Psychology and Psychiatry*, 45, 1437–1453.
- Gibson, J., Adams, C., Lockton, E., & Green, J. (2013). Social communication disorder outside autism? A diagnostic classification approach to delineating pragmatic language impairment, high functioning autism and specific language impairment. *Journal of Child Psychology and Psychiatry*, In press.
- Gilmour, J., Hill, B., Place, M., & Skuse, D. (2004). Social communication deficits in conduct disorder: A clinical and community survey. *Journal of Child Psychology and Psychiatry*, 45, 967–978.
- Happé, F.G.E. (1993). Communicative competence and theory of mind in autism: A test of relevance theory. *Cognition*, 48, 101–119.
- Holck, P., Nettelbladt, U., & Sandberg, A.D. (2009). Children with cerebral palsy, spina bifida and pragmatic language impairment: Differences and similarities in pragmatic ability. *Research in Developmental Disabilities*, 30, 942–951.
- Horowitz, L., Jansson, L., Ljungberg, T., & Hedenbro, M. (2006). Interaction before conflict and conflict resolution in pre-school boys with language impairment. *International Journal of Language and Communication Disorders*, 41, 441–466.
- Howlin, P., Mawhood, L., & Rutter, M. (2000). Autism and developmental receptive language disorder—a follow-up comparison in early adult life. II: Social, behavioural, and psychiatric outcomes. *Journal of Child Psychology and Psychiatry*, 41, 561–578.
- Huerta, M., Bishop, S.L., Duncan, A., Hus, V., & Lord, C. (2012). Application of DSM-5 criteria for Autism Spectrum Disorder to three samples of children with DSM-IV diagnoses of pervasive developmental disorders. *American Journal of Psychiatry*, 169, 1056–1064.
- John, A., Rowe, M.L., & Mervis, C.B. (2009). Referential communication skills of children with Williams syndrome: Understanding when messages are not adequate. *American Journal of Intellectual Developmental Disabilities*, 114, 85–99.
- Katsos, N., Roqueta, C.A., Estevan, R.A.C., & Cummins, C. (2011). Are children with specific language impairment competent with the pragmatics and logic of quantification? *Cognition*, 119, 43–57.
- Kay-Raining Bird, E., Cleave, P.L., White, D., Pike, H., & Helmke, A. (2008). Written and oral narratives of children and adolescents with Down syndrome. *Journal of Speech, Language, and Hearing Research*, 51, 436–450.
- Ketelaars, M.P., Cuperus, J., Jansonius, K., & Verhoeven, L. (2010). Pragmatic language impairment and associated behavioural problems. *International Journal of Language and Communication Disorders*, 45, 204–214.
- Ketelaars, M.P., Cuperus, J., van Daal, J., Jansonius, K., & Verhoeven, L. (2009). Screening for pragmatic language impairment: The potential of the Children's Communication Checklist. *Research in Developmental Disabilities*, 30, 952–960.
- Laws, G., & Bishop, D.V.M. (2004). Pragmatic language impairment and social deficits in Williams syndrome: A comparison with Down's syndrome and specific language impairment. *International Journal of Language and Communication Disorders*, 39, 45–64.
- Leekam, S.R., Tandos, J., McConachie, H., Meins, E., Parkinson, K., Wright, C., ... & Le Couteur, A. (2007). Repetitive behaviours in typically developing 2-year-olds. *Journal of Child Psychology and Psychiatry*, 48, 1131–1138.
- Leonard, M.A., Milich, R., & Lorch, E.P. (2011). The role of pragmatic language use in mediating the relation between hyperactivity and inattention and social skills problems. *Journal of Speech, Language and Hearing Research*, 54, 567–579.
- Lord, C., & Jones, R.M. (2012). Re-thinking the classification of autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, 53, 490–509.
- Lord, C., Risi, S., Lambrecht, L., Cook, E.H., Leventhal, B.L., DiLavore, P.C., Pickles, A., & Rutter, M. (2000). The autism diagnostic observation schedule generic: A standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders*, 30, 205–223.
- Lord, C., Rutter, M., DiLavore, P., & Risi, S. (2001). *Autism diagnostic observation schedule (ADOS) manual*. Los Angeles, CA: Western Psychological Services.
- Luyster, R., Gotham, K., Guthrie, W., Coffing, M., Petrak, R., Pierce, K., ... & Lord, C. (2009). The Autism Diagnostic Observation Schedule—Toddler Module: A new module of a standardized diagnostic measure for autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 39, 1305–1320.
- Mackie, L., & Law, J. (2010). Pragmatic language and the child with emotional/behavioural difficulties (EBD): A pilot study exploring the interaction between behaviour and communication disability. *International Journal of Language and Communication Disorders*, 45, 397–410.
- Martin, I., & McDonald, S. (2004). An exploration of causes of non-literal language problems in individuals with Asperger Syndrome. *Journal of Autism and Developmental Disorders*, 34, 311–328.
- Marton, K., Abramoff, B., & Rosenzweig, S. (2005). Social cognition and language in children with specific language impairment. *Journal of Communication Disorders*, 38, 143–162.
- McPartland, J.C., Reichow, B., & Volkmar, F.R. (2012). Sensitivity and Specificity of the proposed DSM-5 diagnostic criteria for autism spectrum disorder. *Journal of the American Association of Child and Adolescent Psychiatry*, 51, 368–383.
- Mundy, P., Delgado, C., Block, J., Venezia, M., Hogan, A., & Seibert, J. (2003). *The early social communication scales*. University of Miami. Available from: [http://www.ucdmc.ucdavis.edu/mindinstitute/ourteam/faculty\\_staff/escs.pdf](http://www.ucdmc.ucdavis.edu/mindinstitute/ourteam/faculty_staff/escs.pdf) [last accessed 31 January 2013].
- Nadig, A., Vivanti, G., & Ozonoff, S. (2009). Object descriptions under different communicative demands: How do children with and without autism adapt? *Autism Research*, 2, 1–14.
- Norbury, C.F. (2005). The relationship between theory of mind and metaphor: Evidence from children with language impairment and autistic spectrum disorder. *British Journal of Developmental Psychology*, 23, 383–399.
- Norbury, C.F., & Bishop, D.V.M. (2003). Narrative skills of children with communication impairments. *International Journal of Language and Communication Disorders*, 38, 287–313.
- Norbury, C.F., Brock, J., Cragg, L., Einav, S., Griffiths, H., & Nation, K. (2009). Eye-movement patterns are associated with communicative competence in autistic spectrum

- disorders. *Journal of Child Psychology and Psychiatry*, 50, 834–842.
- Norbury, C.F., Gemmell, T., & Paul, R. (2013). Pragmatic abilities in narrative production: A cross-disorder comparison. *Journal of Child Language*. In press.
- Norbury, C.F., Nash, M., Baird, G., & Bishop, D. (2004). Using a parental checklist to identify diagnostic groups in children with communication impairment: A validation of the Children's Communication Checklist-2. *International Journal of Language and Communication Disorders*, 39, 345–364.
- Norbury, C.F., & Sparks, A. (2013). Difference or disorder? Cultural issues in understanding neurodevelopmental disorders. *Developmental Psychology*, 49, 45–58.
- Oliver, B.R., Barker, E.D., Mandy, W.L., Skuse, D.H., & Maughan, B. (2011). Social cognition and conduct problems: A developmental approach. *Journal of the American Association of Child and Adolescent Psychiatry*, 50, 385–394.
- Phelps-Terasaki, D., & Phelps-Gunn, T. (2007). *Test of pragmatic language* (2nd edn). Austin, TX: Pro-Ed.
- Philofsky, A., Fidler, D., & Hepburn, S. (2007). Pragmatic language profiles of school-age children with autism spectrum disorders and Williams syndrome. *American Journal of Speech-Language Pathology*, 16, 368–380.
- Pijnacker, J., Hagoort, P., Buitelaar, J., Teunisse, J.P., & Geurts, B. (2009). Pragmatic inferences in high-functioning adults with autism and Asperger syndrome. *Journal of Autism and Developmental Disorders*, 39, 607–618.
- Rapin, I. (1996). Historical data. In I. Rapin (Ed.) *Preschool Children with Inadequate Communication: Developmental Language Disorder, Autism, Low IQ. Clinics in Developmental Medicine No. 139* (pp. 57–97). London: Mac Keith Press.
- Rapin, I., & Allen, D. (1983). Developmental language disorders: Nosological considerations. In U. Kirk (Ed.), *Neuropsychology of language, reading and spelling*. New York: Academic Press.
- Reisinger, L.M., Cornish, K., & Fombonne, E. (2011). Diagnostic differentiation of autism spectrum disorders and pragmatic language impairment. *Journal of Autism and Developmental Disorders*, 41, 1694–1704.
- Renfrew, C. (1995). *Bus story test*. Milton Keynes: Speechmark Publishing.
- Robins, E., & Guze, S.B. (1970). Establishment of diagnostic validity in psychiatric illness: Its application to schizophrenia. *American Journal of Psychiatry*, 126, 983–987.
- Rutter, M., Bailey, A. & Lord, C. (2003). *The social communication questionnaire*. Los Angeles: Western Psychological Services.
- Schoen, E., Paul, R. (2009). *Assessing Pragmatic Language Skills in High-Functioning Autism Spectrum Disorders*. Denver, CO: Society for Research in Child Development.
- Semel, E.M., Wiig, E.H., & Secord, W.A. (2003). *Clinical evaluation of language fundamentals – 4UK*. London: Psychological Corporation.
- Skuse, D. (2012). DSM-5's conceptualization of autistic disorders. *Journal of the American Association of Child and Adolescent Psychiatry*, 51, 344–346.
- Strong, C. (1998). *Strong narrative assessment procedure*. Eau Claire, WI: Thinking Publications.
- Tager-Flusberg, H., & Anderson, M. (1991). The development of contingent discourse ability in autistic children. *Journal of Child Psychology and Psychiatry*, 32, 1123–1134.
- Tager-Flusberg, H., Paul, R., & Lord, C. (2005). Language and communication in autism. In D.J. Cohen, & F.R. Volkmar (Eds.), *Handbook of Autism and Pervasive Developmental Disorders* (3rd edn, pp. 335–364). New York: John Wiley and Sons.
- Volden, J., Coolican, J., Garon, N., White, J., & Bryson, S. (2009). Pragmatic language in autism spectrum disorder: Relationships to measures of ability and disability. *Journal of Autism and Developmental Disorders*, 39, 388–393.
- Wetherby, A., & Prizant, B. (1993). *Communication and symbolic behavior scales*. Chicago, IL: Applied Symbolix Inc.
- Whitehouse, A.J., Watt, H.J., Line, E.A., & Bishop, D.V.M. (2009). Adult psychosocial outcomes of children with specific language impairment, pragmatic language impairment and autism. *International Journal of Language and Communication Disorders*, 44, 511–528.
- Wiig, E.H., & Secord, W. (1989). *Test of language competence – Expanded*. San Antonio, TX: Psychological Corporation.
- Wing, L., Gould, J., & Gillberg, C. (2011). Autism spectrum disorders in the DSM-5: Better or worse than the DSM-IV? *Research in Developmental Disabilities*, 32, 768–773.
- World Health Organisation. (2013). *International Classification of Diseases – 11. Proposed criteria for Pragmatic Language Impairment*. Available from: <http://www.who.int/classifications/icd/revision/en/index.html> [last accessed 31 January 2013].
- Young, E.C., Diehl, J.J., Morris, D., Hyman, S.L., & Bennetto, L. (2005). The use of two language tests to identify pragmatic language problems in children with autism spectrum disorders. *Language, Speech and Hearing Services in Schools*, 36, 62–72.

Accepted for publication: 16 July 2013

Published online: 9 October 2013